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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/988,994

11/21/2001

Tetsuya Hori

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9525

20457

7590

06/03/2004

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EXAMINER

GENCO, BRIAN C

ART UNIT

PAPER NUMBER

2615

26

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/988,994

Applicant(s)

HORI ET AL.

Examiner

Brian C Genco

Art Unit

2615

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-35 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 15-35 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: Examiner's Illustrations.

Applicant's amendment filed March 12, 2004 has been fully considered by the Examiner but is not deemed persuasive.

Examiner appreciates and thanks Applicant for amending the claims as requested during the interview on March 1, 2004, however, upon further consideration of the teachings of Applicant's Admitted Prior Art (AAPA) in view of Endsley, the amendment to the claims do not overcome the rejection previously presented. Examiner apologizes for any inconvenience to the Applicant. Previously, Examiner noted that AAPA disclose to generate three color planes of high resolution image data due to shifting as illustrated on page 1 of Examiner's illustrations. The Endsley reference was used to teach to utilize the green output for a monochromatic image. In combining the two references the Examiner had indicated that it would have been obvious to simply output the green color plane out of the three generated color planes in order to generate the monochromatic image. As such, a suggestion was made to include an exclusive statement such that only a green color plane exclusive of the others would be generated in order to overcome the previous combination. However, upon further consideration of the Endsley reference there is further teaching to exclusively output the green image data from the image sensor so as to enable a readout of image data that is twice as fast. The details of the combination in view of this teaching are explained herein bellow.

Examiner notes that AAPA teaches to shift an image sensor a predetermined number of times by a predetermined pixel pitch and subsequently output the complete color planes of each of the colors. Examiner has attached illustrations of the perceived mode of operation of AAPA on page 1 of Examiners illustrations. As shown, all three color planes are generated, wherein

these color planes are then computationally combined so as to generate a monochromatic image. This is a long and computationally intensive process. See page 3, line 2 – page 5, line 27.

Endsley teaches to generate a monochromatic image by using only the green pixels of an image sensor with the Bayer color filter (column 5, lines 43-48). See page 2 of Examiners illustrations. Endsley discloses that when generating a motion image 320x240 green pixels, 160x120 red pixels, and 160x120 blue pixels are used to generate a single image (column 6, lines 45-49). When generating a monochromatic motion image only the 320x240 green pixels are output resulting in a frame rate that is twice that of the color motion image (column 7, lines 44-54). Examiner notes that while Endsley discloses these details with regards to motion image generation Endsley also discloses that various combinations of features can be used such as a high resolution monochromatic still image wherein the same concept can be used (column 8, lines 34-47).

In combining the AAPA in view of Endsley note page 3 of Examiners illustrations wherein one of ordinary skill in the art would clearly recognize that when in a monochromatic output mode to capture a first image and output only the green pixel locations as taught by Endsley so as to have an output that is twice as fast as the output of the first image disclosed by AAPA. A pixel shift and second image would then be taken as taught by AAPA to generate a high resolution image wherein only the green pixel locations would be output again. These images would then be combined to generate a high resolution image as taught by AAPA. This end result would be a high resolution monochromatic image that was generated at least twice as fast as in the prior art method. Examiner notes that this explanation was made with the pixels being shifted by an integer number pixel pitch wherein the same would be true for shifting the pixels by $1/n$ (where n is an integer).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 15-30 are rejected under 35 U.S.C. 103(a) as being obvious over (Applicant's admitted prior art) in view of (USPN 6,005,613 to Endsley et al.).

In regards to claim 15 Applicant's admitted prior art discloses an image processing apparatus comprising:

an imaging optical system for forming an image of an object on an imaging surface (e.g., page 1, lines 9-13);

a color imaging device including photo-detectors and a color filter arranged on the imaging surface in two-dimensions, for performing photoelectric conversion of the image of the object formed by the imaging optical system to obtain image data of the image of the object extracted through selected only one color of the color filter (e.g., Fig. 4A; page 2 lines 14-19; page 3, lines 2-14);

shift drive means for shifting the imaging optical system and the photodetectors relative to each other (e.g., Figs. 4B and 4D; page 3, lines 2-14; page 4, lines 6-15);

a control unit for generating single synthesized image data using image data of the image of the object obtained through selected only one color of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction (e.g., page 3, lines 11-14; page 4, lines 11-15).

Applicant's admitted prior art does not disclose extracting the only one color of the color filter exclusive of other non-selected colors of the color filter or that the control unit includes output means for outputting the single synthesized image data as single monochromatic image data.

Endsley et al., herein Endsley, discloses a camera with multiple output modes wherein a user can easily switch between a color image and a monochromatic image (e.g., column 5, lines 43-47; column 6, lines 3-14). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have used Endsley's method of switching color modes in order to easily switch between a color image and a monochromatic image. Thus, as disclosed by Endsley, in the monochromatic color mode only green image data is output. Examiner notes that this enables the output to occur twice as fast as that in the color mode (column 7, lines 44-54). In combining this teaching with Applicant's admitted prior art only the green image data is output for each frame of image data taken. Examiner notes that Applicant's admitted prior art teaches that generating the monochromatic image using the prior art method disclosed by Applicant requires a long time (page 5, lines 13-19). Therefore it further would have been obvious to one of ordinary skill in the art at the time of the invention to have simply output the green image data for each frame of image data taken and to thus use that image data to form a high resolution monochromatic image in order to reduce processing time and enable easy switching between monochrome and color image outputs.

In regards to claim 16 see Fig. 4A and page 2, lines 14-19.

In regards to claim 17 Applicant's admitted prior art teaches shifting by either 1 pixel wherein $n=1$ or by half a pixel wherein $n=2$.

In regards to claim 18 note that Applicants admitted prior art teaches to shift the pixels a plurality of times by half a pixel.

In regards to claim 19 see Figs. 4B and 4D. Examiner notes that each time an image shift takes place a new image is produced. As such, the control unit obtains N images, when the predetermined number of times is N.

In regards to claim 20 note that Endsley discloses that only the green image data is used.

In regards to claims 21-35 see Examiners notes on the rejections above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian C. Genco who can be reached by phone at 703-305-7881 or by fax at 703-746-8325. The examiner can normally be reached on Monday thru Friday 8:30am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on 703-308-9644. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is 703-308-4357.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

Art Unit: 2615

applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Brian C Genco
Examiner
Art Unit 2615

May 12, 2004

A handwritten signature in black ink, appearing to read 'Andrew Christensen', with a long horizontal flourish extending to the right.

ANDREW CHRISTENSEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

AAPA

page 3, lines 11-28
Figs. 4B, 4C

①

1st image

G_1	R_1
B_1	G_1

shift →

2nd image

R_2	G_2
G_2	B_2

↓ shift

G_3	B_3
R_3	G_3

3rd image

← shift

B_4	G_4
G_4	R_4

4th image

⇒

G_1	G_2
G_2	G_1

R_2	R_1
R_3	R_4

B_4	B_3
B_1	B_2

↓

Monochromatic
image

USPN 6,005,613 to Endsley et al.

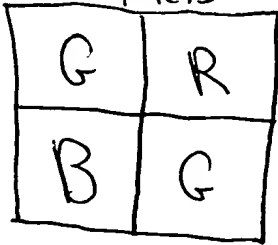
②

column 5, lines 43-48

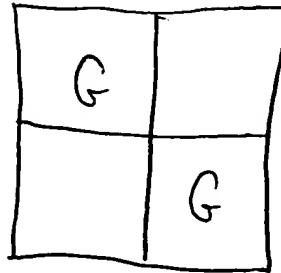
column 6, lines 45-49

column 7, lines 44-54

320x240 G pixels
160x120 R pixels
160x120 B pixels

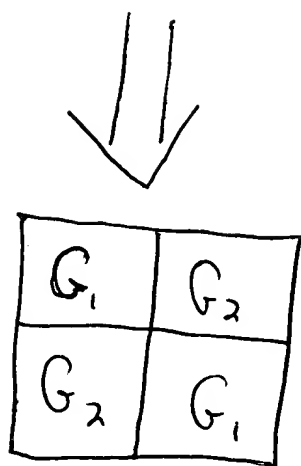
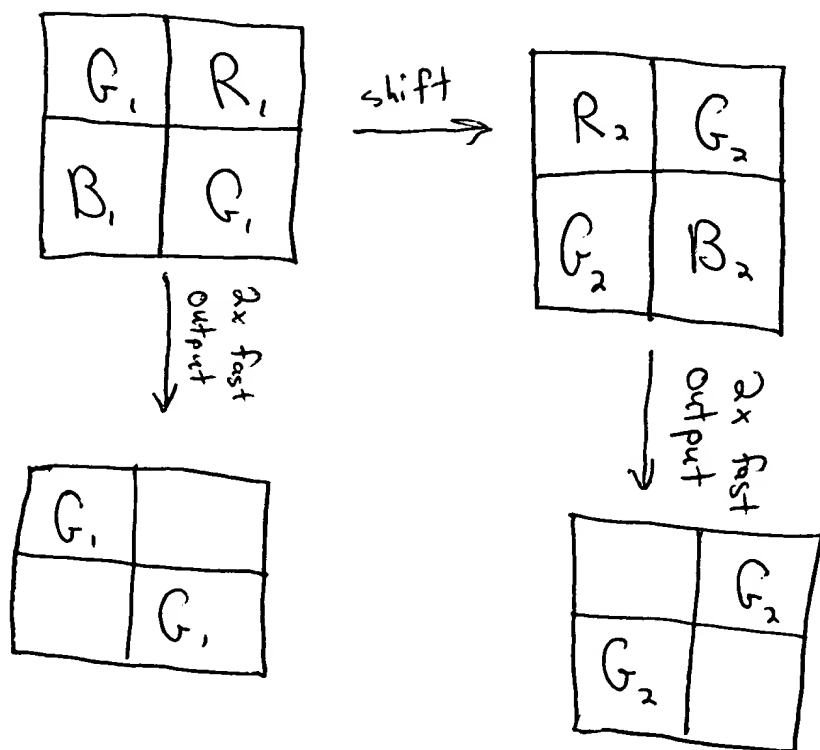


320x240 G pixels



monochromatic image
Output is twice
as fast

AAPA in view of Endsley



$\geq 2x$ fast as AAPA method